We claim:

1. A process for the preparation of carbonyl chlorides by reacting carboxylic acids with phosgene or thionyl chloride in the presence of a catalyst adduct of an N,N-disubstituted formamide of the formula (I)

(I)

in which R^1 and R^2 independently of one another are C_1- to C_4-alkyl or R^1 and R^2 together are a C_4- or C_5-alkylene chain, and phosgene or thionyl chloride, which comprises introducing hydrogen chloride during and/or after the reaction.

2. A process as claimed in claim 1, wherein, overall, a molar amount of hydrogen chloride of 0.2 to 2.0, based on the molar amount of carboxylic acid employed, is used.

3. A process as claimed in claims 1 to 2, wherein, in the reaction with phosgene, a molar amount of N,N-disubstituted formamide (I) of 0.05 to 2.0, based on the molar amount of carboxylic acid employed, is used.

4. A process as claimed in claims 1 to 2, wherein, in the reaction with thionyl chloride, a molar amount of N,N-disubstituted formamide (I) of 0.001 to 0.05, based on the molar amount of carboxylic acid employed, is used.

5. A process as claimed in claims 1 to 4, wherein, during the reaction, a molar amount of phosgene or thionyl chloride of 1.0 to 2.0, based on the molar amount of carboxylic acid, is used.

6. A process as claimed in claims 1 to 5, wherein the molar proportion of the catalyst adduct of the N,N-disubstituted formamide (I) and phosgene or thionyl chloride, based on the molar amount of N,N-disubstituted formamide (I) plus catalyst adduct, is less than 0.3 after the reaction.

7. A process as claimed in claims 1 to 5, wherein the molar proportion of the catalyst adduct of the N,N-disubstituted formamide (I) and phosgene or thionyl chloride, based on the

molar amount of N,N-disubstituted formamide (I) plus catalyst adduct, is less than 0.1 after the reaction.

8. A process as claimed in claims 1 to 7, wherein the carbonyl chloride is isolated from the reaction mixture following the reaction by phase separation.

9. A process as claimed in claims 1 to 8, wherein the N,N-disubstituted formamide (I) used is N,N-dimethylformamide.

10. A process as claimed in claims 1 to 9, wherein, following the reaction, the N,N-disubstituted formamide (I), its hydrochloride and catalyst adduct are separated off and reused as catalyst precursor in the carbonyl chloride synthesis.

11. A process as claimed in claims 1 to 10, wherein the carboxylic acids are reacted with phosgene.

12. A process as claimed in claims 1 to 11, wherein the carbonyl chlorides prepared are acetyl chloride, propionyl chloride, butyryl chloride, valeryl chloride, isovaleryl chloride, pivaloyl chloride, caproyl chloride, 2-ethylbutyryl chloride, enanthyl chloride, caprylloyl chloride, 2-ethylhexanoyl chloride, pelargonoyl chloride, isononanoyl chloride, capryl chloride, neodecanoyl chloride, lauroyl chloride, myristoyl chloride, palmitoyl chloride, stearoyl chloride, oleoyl chloride, linoleoyl chloride, linolenoyl chloride, arachidoyl chloride and behenoyl chloride, and mixtures thereof.

Process for the preparation of carbonyl chlorides

Abstract

Process for the preparation of carbonyl chlorides by reacting carboxylic acids with phosgene or thionyl chloride in the presence of a catalyst adduct of an N,N-disubstituted formamide of the formula (I)

(I)

in which R^1 and R^2 independently of one another are C_1- to C_4-alkyl, or R^1 and R^2 together are a C_4- or C_5-alkylene chain, and phosgene or thionyl chloride, in which hydrogen chloride is added during and/or after the reaction.

We claim:

1. A process for the preparation of carbonyl chlorides by reacting carboxylic acids with phosgene or thionyl chloride in the presence of a catalyst adduct of an N,N-disubstituted formamide of the formula (I)

(I)

in which R^1 and R^2 independently of one another are C_1- to C_4-alkyl or R^1 and R^2 together are a C_4- or C_5-alkylene chain, which comprises introducing hydrogen chloride during the reaction.

2. A process as claimed in claim 1, wherein, overall, a molar amount of hydrogen chloride of 0.2 to 2.0, based on the molar amount of carboxylic acid employed, is used.

3. A process as claimed in claims 1 to 2, wherein, in the reaction with phosgene, a molar amount of N,N-disubstituted formamide (I) of 0.05 to 2.0, based on the molar amount of carboxylic acid employed, is used.

4. A process as claimed in claims 1 to 2, wherein, in the reaction with thionyl chloride, a molar amount of N,N-disubstituted formamide (I) of 0.001 to 0.05, based on the molar amount of carboxylic acid employed, is used.

5. A process as claimed in claims 1 to 4, wherein, during the reaction, a molar amount of phosgene or thionyl chloride of 1.0 to 2.0, based on the molar amount of carboxylic acid, is used.

6. A process as claimed in claims 1 to 5, wherein the molar proportion of the catalyst adduct of the N,N-disubstituted formamide (I) and phosgene or thionyl chloride, based on the molar amount of N,N-disubstituted formamide (I) plus catalyst adduct, is less than 0.3 after the reaction.

7. A process as claimed in claims 1 to 5, wherein the molar proportion of the catalyst adduct of the N,N-disubstituted formamide (I) and phosgene or thionyl chloride, based on the

molar amount of N,N-disubstituted formamide (I) plus catalyst adduct, is less than 0.1 after the reaction.

8. A process as claimed in claims 1 to 7, wherein the carbonyl chloride is isolated from the reaction mixture following the reaction by phase separation.

9. A process as claimed in claims 1 to 8, wherein the N,N-disubstituted formamide (I) used is N,N-dimethylformamide.

10. A process as claimed in claims 1 to 9, wherein, following the reaction, the N,N-disubstituted formamide (I), its hydrochloride and catalyst adduct are separated off and reused as catalyst precursor in the carbonyl chloride synthesis.

11. A process as claimed in claims 1 to 10, wherein the carboxylic acids are reacted with phosgene.

12. A process as claimed in claims 1 to 11, wherein the carbonyl chlorides prepared are acetyl chloride, propionyl chloride, butyryl chloride, valeryl chloride, isovaleryl chloride, pivaloyl chloride, caproyl chloride, 2-ethylbutyryl chloride, enanthyl chloride, capryloyl chloride, 2-ethylhexanoyl chloride, pelargonoyl chloride, isononanoyl chloride, capryl chloride, neodecanoyl chloride, lauroyl chloride, myristoyl chloride, palmitoyl chloride, stearoyl chloride, oleoyl chloride, linoleoyl chloride, linolenoyl chloride, arachidoyl chloride and behenoyl chloride, and mixtures thereof.